Microsoft Exchange Server

Chapter 5
Exchange 2000 Migration Planning

Planning Guide

Abstract

This chapter outlines the steps to plan a successful Exchange 2000 migration. After completing these steps, you should have a firm understanding of the requirements for planning a migration to the Microsoft Exchange 2000 messaging system.

This is a preview edition of the Microsoft Exchange 2000 Server Upgrade Series. The final documentation will be available in November 2000.

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DEVELOPING YOUR MIGRATION STRATEGY

The purpose of this chapter is to provide you with guidelines for planning a migration from Exchange 5.5 to the Exchange 2000 messaging system.

This chapter is intended for those customers who are currently using Exchange 5.5 as their messaging system. If you are not using Exchange 5.5 as your messaging system, this chapter will provide you with insight into Exchange 2000, but you should refer to the Exchange Deployment Planning Guide as your migration planning resource.

Resource Requirements

The current messaging system administrators should lead the effort to plan the migration to Exchange 2000. However, network administrators, DNS administrators, Windows 2000 (including Active Directory) administrators, and workstation administrators should assist with information gathering. (Much of this information gathering should have been performed prior to the planning activities outlined in this chapter.)

As stated earlier, this chapter will help you build an Exchange 2000 migration plan. This section focuses on strategic planning that will reduce time and costs involved in the actual migration as well as costs associated with maintaining your system over time.

As with most technical deployment efforts, you will find that you can achieve a faster return on your migration/upgrade costs if you can reduce your administrative burden. With Exchange 2000, the easiest way to achieve this goal is to reduce the number of mail servers your organization currently has installed. This will significantly reduce the number of repetitive administrative tasks that you must perform. If you have upgraded your network connections between your data centers and remote offices, you may also be able to centralize your servers, thus making them easier to administer. Both of these strategies are discussed in this chapter.

What You Will Need

To prepare your strategy, you should have the following information on hand:

- Documentation on your current Windows 2000 Active Directory design
- Documentation on your current Exchange Site Design
- Documentation on your current physical network design

What You Should Know

In addition, you should know the following about your future system:

- Physical capabilities of your planned Exchange 2000 servers
- How many users you plan to host on your Exchange 2000 servers

Overview of Server Consolidation Methods

There are two primary areas of an existing Exchange 5.5 architecture you can examine to see where you can consolidate servers by using Exchange 2000. The first way in which Exchange 2000 allows you to consolidate servers is through the ability of Exchange 2000 to host a much larger number of mailboxes on a single server. The other area of consolidation is the ability to partition resources on an Exchange 2000 server better than you could with Exchange 5.5. Each of these will be discussed in further detail in the following sections.

Exchange 2000 Mailbox Hosting

Exchange 5.5 places all of the mailboxes on a server in a single information store. Because of this, backup and restore performance limits the effective available size of an Exchange 5.5 database to around 30 gigabytes (GB). Therefore, if you allocate 50 MB for each mailbox, you can only have about 600 users on a single Exchange 5.5 server. If an organization has 25,000 mailboxes, this means the organization must have at least 42 servers for mailboxes alone.

Exchange 2000 removes this limitation by allowing as many as 20 databases on a single server. You should still limit the size of the databases on the server to allow for fast database backups and restores. Even so, you can now host the same 25,000 users on as few as seven Exchange 2000 servers, provided that the servers have sufficient storage. To reach this conclusion, we used the following configuration:

20 GB per database

50 MB per user mailbox

400 mailboxes per database

62.5 databases for the organization

10 databases per server to allow for expansion

7 servers hosting the 10 databases

The major requirements for hosting large numbers of users on a single Exchange 2000 server are enough RAM, fast enough CPUs, and enough hard-disk space. With the new external storage arrays now available, it should be relatively easy to provide enough disk space. The CPU has almost never been a resource bottleneck on an Exchange 5.5 server, and remains this way with Exchange 2000. As for RAM, you should be sure to have plenty for any Exchange 2000 server configuration. If you use all the functionality of Exchange 2000, it will use more RAM than Exchange

5.5 does. Based on your current Exchange 5.5 servers, you can make educated guesses on the requirements for these resources.

An added advantage to consolidating mailboxes is that if you have important users, such as the vice presidents in your organization, who require faster restores in case of failure, these mailboxes can all be in a single, very small database. This database can also have a more frequent backup schedule, which in turn will allow for faster recoveries. (A more frequent backup schedule results in fewer transaction logs at any given time, which in turn means faster server startup after a recovery.)

Other advantages you will find if you consolidate your messaging servers on fewer Exchange 2000 systems are:

- Fewer servers to administer, which will ease the cost of administration
- Less hardware to maintain, since purchasing additional drive space is far cheaper than purchasing additional servers
- Fewer possible bottlenecks in your messaging system, which will help you ensure faster message delivery
- Licensing costs saved in terms of OS, Exchange, and even backup software
- Increased room in already overcrowded data centers

Exchange 2000 Resource Partitioning

In Exchange 5.5, if you had to place mailboxes on a server that also had public folders or connectors, you needed to be sure that users were alerted when you performed maintenance on the other resources. This was a result of having to stop the Exchange services as part of the maintenance process.

Exchange 2000 allows you to dismount certain stores, while allowing the others on the same server to remain online. Public folders have always been hosted in their own information store, but you can now place mailboxes used by connectors into a separate information store. This allows you to dismount either public folders or a connector without impacting users' access to their mailboxes.

Note: This configuration is not available for all connectors.

Examining Current Exchange System

Once you understand the possibilities Exchange 2000 provides, examine your current Exchange 5.5 system to see where Exchange 2000 might provide benefits. To start this process, you should look at your organization at three levels:

- Your data center level

- Your infrastructure at an Exchange site level[1]
- Each individual server

Exchange System Review at the Data Center Level

The primary reason to review at this level is that there are typically a larger number of Exchange 5.5 servers at data centers. Consolidating these servers first allows you to quickly and easily consolidate Exchange 5.5 servers to fewer Exchange 2000 servers without having to redesign your Exchange topology or server locations. For instance, if you have six Exchange 5.5 servers in a data center and an Exchange 5.5 server in each of two remote offices, you would first consolidate the six Exchange 5.5 servers before considering the other two Exchange 5.5 servers. To consolidate the two Exchange 5.5 servers in the remote offices would require you to determine where the consolidated server would reside and still be able to provide the email performance to which the users in the remote offices had become accustomed. This would be a longer process then simply starting your migration by concentrating on the data centers where there are a large number of users and mailboxes.

In the vernacular of this guide, there are three types of offices where Exchange server reduction would be most beneficial. These are the Global Headquarters (GHQ), the Regional Branch Office (RBO), and the Large Branch Office (LBO). You may be able to reduce servers in Medium Branch Offices (MBO), but Small Branch Offices (SBO) would generally have no local Exchange server. (Some organizations have SBOs with Exchange servers due to very slow WAN connections. If you have offices like this, for the purpose of your Exchange system review, treat them as MBOs.)

[1] The datacenter and site level reviews may be synonymous in some organizations.

Global Headquarters

This office type consists of the central organizational offices. Typically, the highest concentration of Exchange 5.5 servers is found in this location. In large organizations, the primary support staff is also located here in most case. In a typical configuration, there are several Exchange 5.5 mailbox servers and public folder servers in the global headquarters office, along with connector servers to other messaging systems. Any of these Exchange 5.5 servers are targets for consolidation to Exchange 2000.

Regional Branch Offices

The RBO is connected to the GHQ and other types of offices. An RBO may have a small regional support staff and is typically the central office for a region, and as such, hosts servers and services for the offices in that region. As such, it may also host several mailbox and connector servers. There may also be public folder servers at an RBO, depending on how extensive the organization's public folder hierarchy is. Again, you may want to consolidate any of these Exchange 5.5 servers on Exchange 2000.

Large Branch Offices

The LBO is similar to the RBO, but hosts no services for other offices. This normally means that there will not be Exchange 5.5 connector or public folder servers in these offices unless each is its own site. However, an LBO may have large numbers of Exchange 5.5 mailbox servers. Consolidating on Exchange 2000 servers will allow you to reduce the number of Exchange 5.5 servers at your LBOs.

Medium Branch Offices

The only consolidation you see in an MBO is either when there is more than one Exchange 5.5 server in the office, or through Exchange server centralization. The former is no different than the LBO, and the latter would leave the MBO without an Exchange server (effectively the same as an SBO in this scenario). One caution on Exchange server centralization is that you should be sure there is enough available network bandwidth for users to access their Exchange servers remotely.

Exchange System Review at the Site Level

If your Exchange sites are mapped to your data centers, you have already completed this part of the review.

If your Exchange sites span multiple locations, you should determine if you could reduce the number of locations in a site where you actually have Exchange servers. If you have enough stable bandwidth for a single site, you may be able to host user connections to remote Exchange servers rather then having a local Exchange server. To do this, you should be sure that your client response service levels are not degraded

if you use this consolidation strategy and do not have a local Exchange server.

In general, since Exchange 2000 uses the same MAPI clients that your current Exchange users have, they require about the following bandwidth for each open mailbox.

User Type	Bandwidth
Light Mail User	1.5 kb
Medium Mail User	2.5 kb
Heavy Mail User	4 kb

This means that if you have 20 light users in a location, and there is a 64 kb connection, they may be able to adequately access their mailboxes across the WAN connection (20 users x 1.5 kb = 30 kb). However, if you have 20 heavy users and the same 64 kb connection, there will not be enough bandwidth for users to have adequate access to their mailboxes (20 users x 4 kb = 80 kb).

The minimum recommended connection speed is 56 kb. However, whenever accessing a server across any slow link, you should always test the actual implementation to ensure the expected performance level can be achieved.

Exchange System Review at the Individual Server Level

Once you have completed the above reviews, you should complete your review process at the individual Exchange 5.5 server level. This will allow you to determine which Exchange 5.5 servers can be upgraded and consolidated, upgraded but not consolidated, or retired after their resources are moved to other servers.

As you review each Exchange 5.5 server, you will likely discover that some servers are used more than others. For instance, if your IMCs are running at 90 percent CPU utilization during normal operations, you may not be able to move this functionality to servers that are also handling mailboxes. In addition, you may find that some of your mailbox servers are already CPU-bound due to mailbox rules.

And finally, there may be some Exchange servers that are currently hosting applications or connectors that can’t be upgraded because the application or connector isn’t supported on Exchange 2000. You should note these systems as legacy systems, which you will review periodically to see if they are still necessary in your organization.

BUILDING A MIGRATION PLAN

Once you have determined where you can reduce the number of Exchange servers your organization has through consolidation, you should start planning specific strategies for all of the servers in your organization. This will include whether a server will be upgraded, migrated, or left alone, as well as when you will perform these actions.

Note: Throughout this discussion, the terms *migrate* and *upgrade* are used, and must be understood. For Exchange servers, the terms are fairly obvious: *migrate* means you move the resources from a downlevel Exchange server to an Exchange 2000 server, and *upgrade* means you upgrade an Exchange 5.5 SP3 server to Exchange 2000. However, when this document refers to upgrading an Exchange *site*, it means that the servers in that site begin as downlevel Exchange servers and end up as Exchange 2000 servers. For the purposes of this chapter, once you have a mixed-version Exchange site, you have started the upgrade process on that site**.**

What You Will Need

To build your plan, you should have the following information on hand:

- Your Exchange 2000 migration strategy
- Your Windows 2000 Active Directory Site Design

What You Should Know

In addition, you should have:

- External information that will influence your security design – these include any legal regulations and requirements
- Requirements that were not implemented as part of your current Exchange design

Exchange 2000 Routing Groups and Administrative Groups

Your Exchange 2000 Routing Groups and Administrative Groups will map directly to your current Exchange sites. You cannot change this until after you move to native mode, which is beyond the scope of this chapter.

Exchange 2000 Upgrade or Migration?

One of the most important questions you must answer is whether you wish to upgrade your servers or migrate their resources to Exchange 2000. For instance, if you have Exchange 5.5 connector servers (also called bridgehead servers), you may be able to upgrade the servers. Due to the small size of the information store, Exchange 5.5 connector servers will upgrade very rapidly. However, if you have

Exchange 5.5 mailbox servers with very large information stores, your service level agreements might not allow you to upgrade the servers. This is because users will not have access to their email during the upgrade process and that may result in their email being unavailable for longer then your service level agreement will allow. Instead, you may be required to migrate these mailboxes to new Exchange 2000 servers to ensure that users do not have access to their email for the shortest amount of time possible.

Having discussed this, you should remember that Exchange 2000 does not support all of the connectors supported by Exchange 5.5. Due to this, you will need to determine whether the current connectors on an Exchange 5.5 server can be supported on an Exchange 2000 server. If one connector is not supported, but there are several connectors on the server, you may want to move the unsupported connector to a different Exchange 5.5 server, then upgrade the initial server to Exchange 2000. You may also be able to replace this connector with an alternate that is supported by both systems. For instance, since many messaging systems now support SMTP, it may be possible to maintain messaging connectivity even without the unsupported connector. This should be investigated and if possible, tested in a lab environment. If the connectivity is sufficient, then the other connectors may be removed.

You can migrate all supported resources on your Exchange 5.5 server to Exchange 2000 through a move-resource process. However, if you migrate Exchange 5.5 servers that are hosting directory replication connectors, they will perform a full replication of the entire directory back to their downlevel Exchange server counterparts.[2]

When you upgrade Exchange servers that are hosting directory replication connectors, the upgrade creates the Site Replication Service (SRS). The SRS is used to replicate the Exchange 2000 configuration to the downlevel Exchange environment. For Exchange servers hosting directory replication connectors, an upgrade rather than a migration is recommended.

Through the public folder replication process, public folders can be migrated to Exchange 2000 without any downtime for the folders themselves. This process allows you to move the public folders and then decommission the old public folder servers when they are no longer needed.

For specific upgrade/migrate recommendations for the various types of Exchange servers, review the following table.

[2] This happens between two Exchange sites whenever you change an Exchange directory replication server.

Server Type	Upgrade/ Migrate	Reasoning
Directory Replication Server	Upgrade	Automatic creation, configuration and activation of the SRS.
Server with Supported Connectors	Upgrade	Small size of information store allows very fast upgrade process. Backup server can handle load during upgrade.
Server with Unsupported Connectors	Must Coexist	These servers cannot be migrated to Exchange 2000 and must remain on downlevel versions of Exchange. Alternatively, these connectors can be replaced with supported connectors and removed from the server. Then the server will be hosting supported connectors only.
Public Folder Server	Either	The decision depends on the amount of data that would need to be upgraded and if hardware is available for the parallel servers.
Mailbox Server	Either	As with Public Folder Servers, the decision depends on how much data needs to be upgraded. However, in many organizations, the added requirement of server consolidation makes the decision to migrate mandatory for many of their servers.
Clustered Exchange Server	Must Migrate	There is no upgrade path for clustered Exchange 5.5 servers. Since these are primarily mailbox servers (very few connectors can be clustered, and public folders allow replication for redundancy), the mailboxes should be migrated to another server, which can be a clustered Exchange 2000 server.

Exchange 2000 Server Upgrade/Migration Timing

After you have determined whether or not to upgrade a server, you should determine which servers to upgrade first in your organization. To say that this depends on your organization is simplifying the issue, but for the most part it is true. One organization may not want to chance upgrading their directory replication bridgehead servers, and will choose

to install clean mailbox servers before continuing. Another organization will see that the directory replication bridgeheads are going to host the SRS anyway, and will choose to upgrade them first so that they do not have to have other SRS servers. These are both valid approaches, and each organization must to determine the order that they are most comfortable with.

There are a few guidelines that apply for any organization, however. These are outlined next.

Site Upgrade Timing Recommendations

- If you are upgrading an organization, you should start with a site for which you have direct control.
- If you are upgrading a small Exchange site (three servers or less), you should start with the directory replication server in the site, and then complete the site upgrade quickly.
- The upgrade process is not a serial process. You can be upgrading one Exchange site and start with another before the first is complete.
- Choose a site with lower usage and server with lower usage as the first server to upgrade
- Upgrade the bridgehead server in the site first, then it will have the SRS.

Server Upgrade/Migration Timing Recommendations

- If you plan on installing clustered Exchange servers, you must install or upgrade another server in your Exchange site before you install a clustered server. This is necessary because the SRS cannot run on a cluster and is required for coexistence with downlevel Exchange servers.
- The hardware on which downlevel Exchange servers are installed may not be capable of running Exchange 2000, and must be replaced rather than upgraded.
- If a server is consistently over 30 percent CPU utilization, consider migrating to new hardware instead of upgrading.
- When upgrading Public Folder servers, the owner mailboxes in the public folder ACLs must be in the Active Directory before upgrading
- Before starting the upgrade process, make sure that all Exchange 5.5 services are in a good state before starting the upgrade. You can stop and restart the Exchange 5.5 services to ensure they are working correctly.

For most organizations, these points imply that:

- The central Exchange site should be the first upgraded.
- Long-established sites on old hardware may need to have their servers replaced in the site upgrade process.

- Remote sites should be upgraded quickly.

There is one more important thing to note when planning server upgrades. The Exchange 2000 upgrade process consists of a manual step that is relatively quick to complete. Rather than performing a full upgrade of the Exchange 5.5 SP3 information store, the process simply modifies the information store schema, and then allows the information store engine to upgrade the information store after this step completes. The store process actually upgrades the information store either as a background process that upgrades the most likely items in the information store (for instance, everyone's Inbox, Calendar, Outbox, and Sent Items folders), or when the users need access to the data (for instance, if a person tries to access their mailbox after the manual process, but before the background process completes).

This two-step upgrade process allows the information store to be available to users quickly, however at a price. If a large number of users try to access their mailboxes right after the upgrade, the store process will become bogged down trying to service the access requests of the users. Because of this, the best plan for upgrades is during a period when very few users will be accessing their mailboxes after the upgrade (possibly on a weekend).

Decommissioning Downlevel Exchange Servers

Finally, no discussion of migration planning would be complete without a section on when it is safe for you to remove the old Exchange servers from the environment. The following is a list of things you should consider when you are decommissioning servers:

Server Type	Conditions
Directory Replication Server	If these are replaced rather than upgraded, as soon as the Exchange 2000 server with the SRS and directory replication connector are established, these servers will no longer have the directory replication connector and should no longer be considered directory replication servers. If there are other resources on these servers, they should be reclassified for that resource (i.e., mailboxes, public folders, and so forth.)
Server with Supported Connectors	Once the Exchange 2000 connector or connectors have been proven, this connector should be set with a cost of 100. This will keep it from being used, while still being available if there are problems. If there are no issues with this setting and if no messages are seen using this connector (check the message tracking logs), this server can be

Server Type	Conditions
	decommissioned. If there are multiple connectors on this server, this process will have to be done with each of the connectors. This can be a parallel process.
Server with Unsupported Connectors	These servers cannot be decommissioned and must remain until they are no longer necessary.
Public Folder Server	Once the full compliment of public folders this system has been hosting is fully replicated to the Exchange 2000 servers (as shown by a status of “In Sync” for the folder on the Exchange 2000 server), the replica can be removed from the server. Once all public folder replicas are removed from this server, it can be decommissioned.
Mailbox Server	Once all mailboxes have been moved from this server to Exchange 2000 servers, this server can be decommissioned.
Clustered Exchange Server	Once all resources this server is hosting have been moved to Exchange 2000 servers, this server can be decommissioned.
The Downlevel Exchange “First Server”	With the exception of the routing calculation, the Exchange First Server resources should be moved to Exchange 2000 servers. The routing calculation service is required as long as there is a downlevel Exchange server in the site, but this can be moved to other downlevel Exchange servers if necessary.
Other Server Types	If there are other server types in your environment, and these are required for the Exchange 5.5 servers, they will have to remain until all other Exchange 5.5 servers are decommissioned. If they can’t be recreated on Exchange 2000, and are required for your environment, you may not be able to decommission these servers. If neither of these is an issue, you can decommission them at your discretion.

This chapter described what you should do to build a migration strategy for each individual Exchange site and office in your organization. You were then shown how to move from a migration strategy to building your actual migration plan.

Your next step in the migration is to build your Exchange 2000 security model and your Exchange 2000 administration model.